

REMARKS

The Office action dated January 16, 2003 and the cited references have been carefully considered.

Remarks Regarding Amendments to the Abstract

The abstract is amended to replace "alkali-earth" with --alkaline-earth--. This amendment is made to name correctly the group of elements disclosed in the original specification (calcium, barium, and strontium). No new matter has been added.

Status of the Claims

Claims 1-25 and 39-46 are pending. Claims 1-22 and 39-46 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Jin et al. (U.S. Patent 6,250,984; hereinafter "Jin"). Claims 23-25 are rejected under 103(a) as being unpatentable over Jin in view of Lynn (U.S. Patent 6,294,867). The Applicants respectfully traverse all of these rejections for the reasons set forth below.

Claim Rejection Under 35 U.S.C. § 103(a)**Claims 1-22 and 39-46**

Claims 1-22 and 39-46 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Jin. The Applicants respectfully traverse this rejection because Jin not only does not teach or suggest combining the elements of claims 1-22 and 39-46, but Jin in fact teaches away from using alkaline-earth oxides.

"[T]he legal conclusion of obviousness [under 35 U.S.C. § 103(a)] requires that there be some suggestion, motivation, or teaching in the prior art whereby the person of ordinary skill would have selected the components that the inventor selected and used them to make the new device." *C.R. Bard, Inc. v. M3 Systems, Inc.*, 48 U.S.P.Q.2d 1225, 1231 (Fed. Cir. 1998). Thus, a prior art reference does not teach or suggest combining the elements of a claim when the reference teaches away from using an element of the claim.

Jin discloses a field emitter comprising carbon nanotubes and a metal, specifically. See; e.g, column 3, lines 16-21; lines 40-43; column 4, line 62. It is clear that Jin desires to use a metal to achieve low electrical resistance to prevent heating. Column 3, line 44; column 5, lines 3-6 and lines 36-37. Furthermore, Jin teaches away from using an oxide such as barium oxide in an emitter. The Examiner quoted Jin, column 1, lines 35-37, as evidence of disclosure of barium oxide, but did not consider further disclosure merely four lines away that barium oxide creates a problem in cathodes. The reference must be considered as a whole, including the parts that diverge from or teaching away from the invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 220 U.S.P.Q. 303, 311 (Fed. Cir. 1983) (It is error to "consider[] references in less than their entireties, i.e., [to] disregard[] disclosures in the references that diverge and teach away from the invention at hand."). Jin discourages the use of barium oxide:

"The requisite heating of thermionic cathodes causes a number of problems. Cathode lifetime is limited because constituents of the cathode, such as barium oxide, evaporate under the high operating temperatures, and when the barium is depleted, the cathode (and hence the tube) no longer perform." Column 1, lines 41-46.

On the contrary, the present invention as claimed in claims 1-22 and 39-46 solves this problem, lowers the required temperature, and reduces the evaporation rate of alkaline-earth oxides of cathodes. Specification, Paragraph 18 and Table 2. Such a success contrary to Jin's conventional wisdom is the clearest evidence of non-obviousness.

The Applicants respectfully traverse the Examiner's apparent position that the Applicants' disclosure that barium oxide has been used as cathode additive renders the combination of carbon nanotubes and barium oxide obvious. The Examiner must consider the claimed invention as a whole, not merely any one element. The question must be whether the reference teach or suggest the claimed invention as a whole. *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 221 U.S.P.Q. 481, 488 (Fed. Cir. 1984) ("The invention must be considered as a whole, and the question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination."). It is not that barium oxide has been used in cathodes, but whether the prior art teach or suggest the combination of barium oxide and carbon nanotubes. Here, it is clear that Jin does not even suggest combining carbon nanotubes and oxygen-containing compounds of alkaline-earth metals, and the Examiner has not

offered an explanation why in the face of Jin's teaching away from using barium oxide, a combination of that compound with carbon nanotubes is even plausible. That the Examiner ignored that Jin teaches away from using barium oxide suggests that Examiner picks and chooses various elements of the reference to reconstruct the claimed invention. Such a hindsight reconstruction is impermissible in a patentability determination under 35 U.S.C. § 103(a). *In re Fritch*, 23 U.S.P.Q.2d 1780, 1784 (Fed. Cir. 1992) ("It is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious. . . . '[O]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.'").

Claims 23-25

Claims 23-25 are rejected under 103(a) as being unpatentable over Jin in view of Lynn. The Applicants respectfully traverse this rejection because Jin teaches away from using oxygen-containing compounds of alkaline-earth metals, and therefore, adding Lynn to show a disclosure of inert gas in a gas discharge device still does not teach or suggest combinations of the elements of each of claims 23-25.

"To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." MPEP § 2143.03 (8th ed., Aug. 2001). "To support the conclusion of obviousness, either the references must expressly or impliedly suggest the claimed combination or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 U.S.P.Q. 972, 973 (B.P.A.I. 1985).

As pointed out above, Jin teaches away from using oxygen-containing compounds of alkaline-earth metals because such compounds have high rates of evaporation under the conditions of hot cathodes. Therefore, adding Lynn to show a disclosure of inert gases in gas discharge devices still does not explain why one of ordinary skill in the art would have combined all of the elements of each of claims 23-25. Consequently, claims 23-25 are patentable over Jin even in view of Lynn.

In view of the above, it is submitted that the claims are patentable and in condition for allowance. Reconsideration of the rejection is requested. Allowance of claims at an early date is solicited.

Respectfully submitted,

Toan P. Vo

Toan P. Vo, Ph.D.
Attorney for the Applicants
Registration No. 43,225
(518)387-6648

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